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FOR THE MAKING OF HONOLULU AS BEAUTIFUL AND
UNIQUE IN CHARACTER, AS NATURE HAS ENDOW-
ED IT IN SCENERY, CLIMATE AND LOCATION.

RECLAMATION
OF THE
WAIKIKI DISTRICT
OF THE

CITY OF HONOLULU,
TERRITORY OF HAWAII.



Recommendations—Maps—Plans and Specifications

By L. E. PINKHAM,
President Board of Health.

APPROVED BY THE BOARD OF HEALTH,
FEBRUARY 21st, 1906.

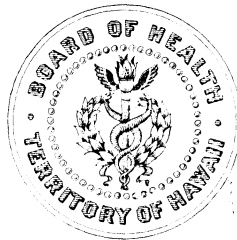


In Memory of
STEPHEN SPAULDING
1907 - 1925
CLASS of 1927
UNIVERSITY OF MICHIGAN

W.H. B. 1927

*FOR THE MAKING OF HONOLULU AS BEAUTIFUL AND
UNIQUE IN CHARACTER, AS NATURE HAS ENDOW-
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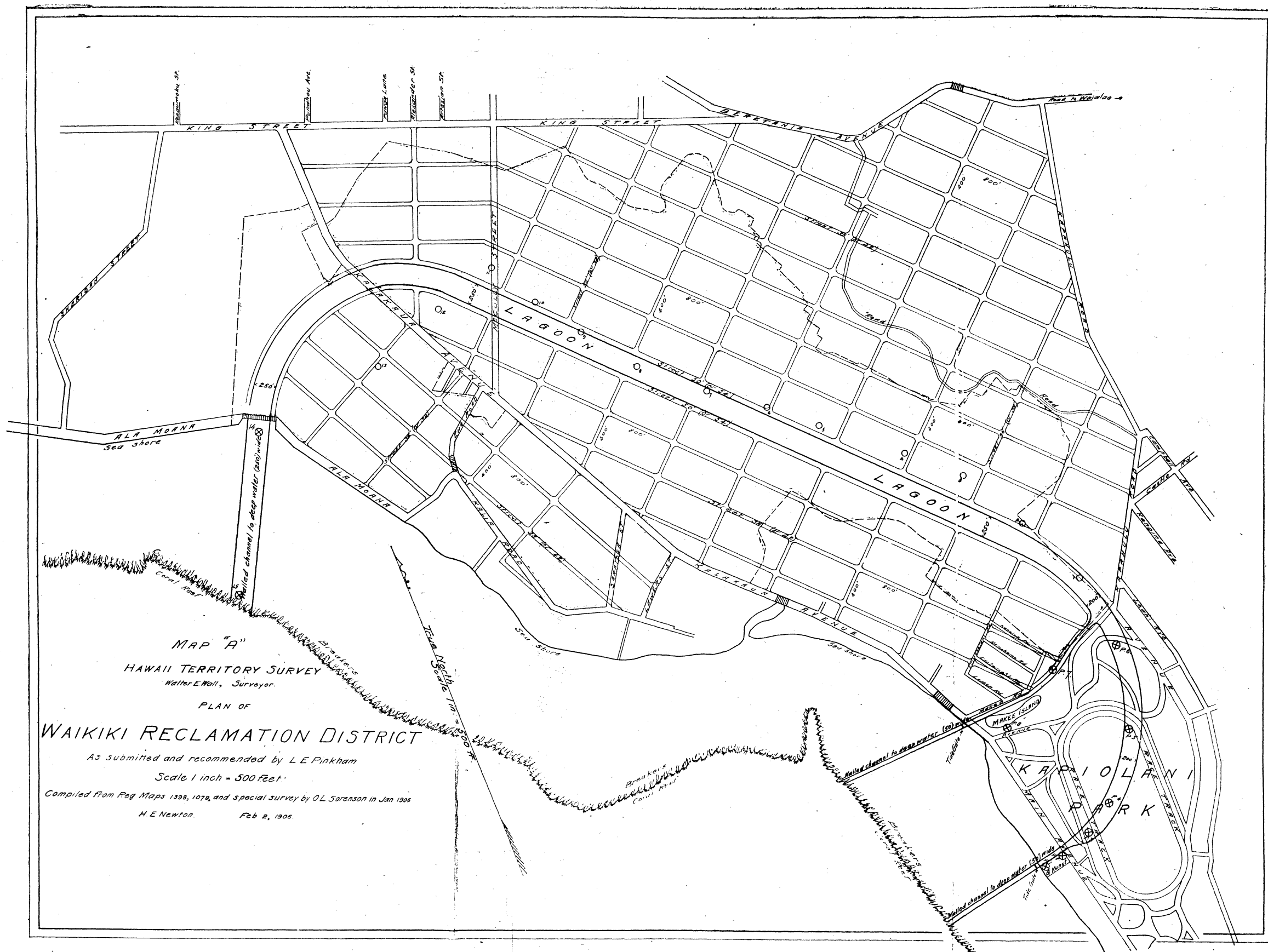
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John M. Sullivan
Col. Thos. M. Sullivan
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RECLAMATION OF THE WAIKIKI DISTRICT.

Honolulu, February 21, 1906.

To the Members of the Board of Health:

Section 1025, Revised Laws of the Territory of Hawaii, reads as follows, and is mandatory:

"Whenever in the opinion of the Board of Health any tract or parcel of land situated in the District of Honolulu, Island of Oahu, shall be deleterious to the public health in consequence of being low, and at times covered or partly covered by water, or of being situated between high and low water mark, or of being improperly drained, or incapable by reasonable expenditure of effectual drainage, or for other reason in an unsanitary or dangerous condition, it shall be the duty of the Board of Health to report such fact to the Superintendent of Public Works together with a brief recommendation of the operation deemed advisable to improve such land."

THE PRESIDENT OF THE BOARD OF HEALTH, AFTER MONTHS OF STUDY AND INVESTIGATION, ASSERTS THE WAIKIKI DISTRICT UNDER CONSIDERATION IS AT THE PRESENT TIME "DELETERIOUS TO THE PUBLIC HEALTH"—"IS LOW, COVERED AND PARTLY COVERED WITH WATER"—IS NOT DRAINED AT ALL—"IS INCAPABLE OF EFFECTUAL DRAINAGE" AND IS "IN AN UNSANITARY AND DANGEROUS CONDITION."

HE FURTHER CLAIMS THAT, AS THIS PARTICULAR LAND IS ENCROACHED UPON, IT WILL BECOME AN INTENSE AND CONSTANT MENACE TO THE HEALTH AND EVERY OTHER SOUND INTEREST OF THE CITY OF HONOLULU.

HE FURTHER CLAIMS THIS DISTRICT IS INCAPABLE OF RECLAMATION BY ANY EXPENDITURE WITHIN THE MEANS OF PRIVATE OWNERS.

THE PRESIDENT OF THE BOARD OF HEALTH RECOMMENDS THAT THE GOVERNMENT, BY ITS RIGHT OF EMINENT DOMAIN, SHALL IN AN EQUITABLE AND JUST MANNER ACQUIRE SUCH OWNERSHIP AND RIGHTS IN SAID DISTRICT AS SHALL ENABLE IT TO TRANSFORM IT INTO AN ABSOLUTELY SANITARY, BEAUTIFUL AND UNIQUE DISTRICT. ONE THAT WILL ADD IMMENSELY TO THE REPUTATION OF HONOLULU AT HOME AND ABROAD.

Your President requests you to consider the facts and argument he herewith places before you, and, should they meet with your approval, to, by resolution, direct the matter be laid before the Superintendent of Public Works, as the law directs, and before the Board of Supervisors of the County of Oahu.

NO CITY CAN TAKE ADVANTAGE OF THE OPPORTUNITIES, NATURE AND ART PRESENT, TO BECOME DISTINGUISHED AS A HEALTHFUL, SANITARY AND BEAUTIFUL CITY, IF IT DEPENDS ON THE CAPRICE OF INDIVIDUAL OWNERS IN ESTABLISHING THE CHARACTER OF AND STREETS OF A DISTRICT.

UNDER SUCH CIRCUMSTANCES NO ARTISTIC OR HARMONIOUS PLAN OF A GREAT DISTRICT CAN BE CONCEIVED OR EXECUTED.

EVEN THE PUBLIC SANITARY AND ALL OTHER PUBLIC UTILITIES BECOME MERE MAKE SHIFTS.

IN THE LONG RUN PUBLIC AND PRIVATE ECONOMY IS IMPOSSIBLE.

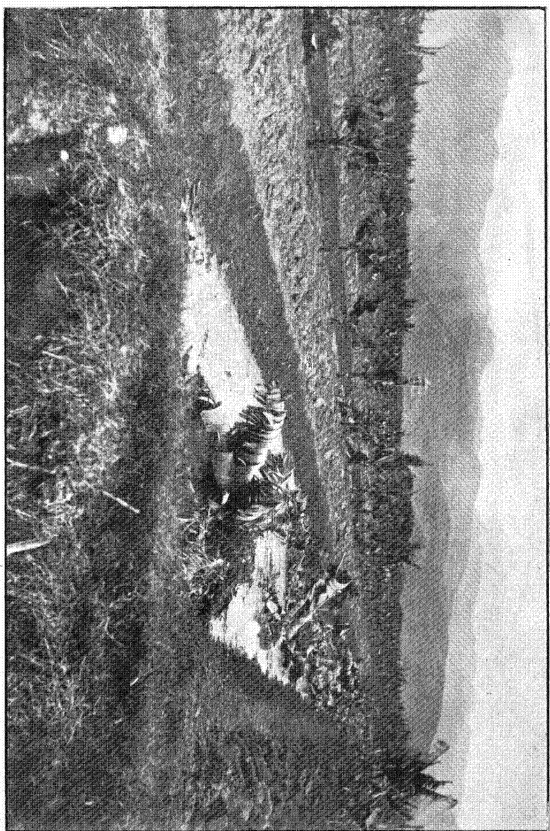


ILLUSTRATION OF BANANA FIELDS—DECAYING VEGETATION. PROPOSED TO RECLAIM.

Map "A" shows within the shaded lines in the Waikiki District, 687 acres of land, all lying below a five-foot grade above sea-level, and utterly incapable of surface or sewer drainage and threatening present and future public health. These lands belong to.....owners and are assessed for taxation the sum of \$. (See table.)

Your President, during the past year, aided by private funds, believes he has satisfactorily solved the problem of flushing Waikiki lagoons with fresh tide water and attempts to show how this experience may be applied to the proposed reclamation district.

Within the past ninety days additional private funds have become available and we have hastened to cause surveys and test borings to be made over this entire Waikiki district, including Kapiolani Park and the Beach addition.

If we may draw logical conclusions from existing and clearly approaching facts, let us try to predict the possible and probable

FUTURE OF HONOLULU.

Nature, situation and human circumstance fix world-wide prominence and importance on certain strategic points in commerce, navigation and defense. Human events have moved slowly, but are becoming intensely accelerated, and it would seem Honolulu is now beginning to fulfil her destiny.

While to us the statement has become trite, we cannot assert too emphatically or frequently the universally acknowledged fact that Honolulu and these Islands possess the combination of incomparable climate and scenery, and are directly within the main stream of world travel, which can never be diverted.

We possess all that nature can grant for a charming place of residence and need only to intelligently and artistically improve and take advantage of the opportunities she has provided.

Given surroundings of refinement, beauty and entertainment and the chance to possess them and Honolulu will acquire rapidly a most desirable population.

Daily the unique position of these Islands in relation to travel, commerce and national defense is making a stronger impression on the world at large. Evidently the Federal Government is alive to the trend of events, and aims to make Honolulu one of the strongest of fortified cities. The result of the recent conflict in the Orient fixes martial and naval activity on the Pacific beyond peradventure.

With the Pacific Coast increasing in population, wealth and enterprise almost miraculously and the Orient awakening, the Pacific Ocean will become a pond, and Honolulu a port of call to a degree now incomprehensible. Ocean sports are just starting. Steamships out-rival railways in comfort, and voyaging to our shores is quick and agreeable.

Already men of wealth have made their homes with us, and, once travel assumes larger proportions, the impulse, already started, of owning homes in Honolulu will gain headway until there is no predicting its limit.

Honolulu desires a population, omitting the consideration of agriculturists, such as has made Los Angeles and other towns of Southern California what they are. Persons and residents of private fortune, who seek an agreeable climate and surroundings, and who expend large already acquired incomes rather than those who expect the community to furnish them the opportunity of earning a livelihood and even that of the accumulation of wealth.

Such persons as we seek desire to find attractive and charming residential districts free from all objectionable features and neighbors. In all cities of refinement such districts exist, and from the residents thereof come the lavish expenditure and patronage that make the general prosperity of the merchants and all classes dependent on their own exertions.

Excusing the absurdity of comparison, the two ways of creating a distinguished city are strikingly illustrated in the

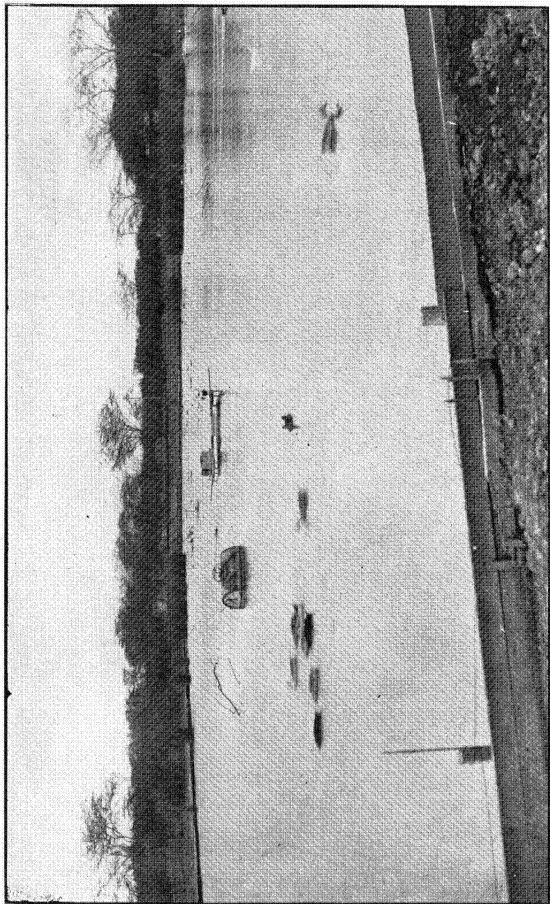


ILLUSTRATION OF MANY DUCK AND FISH PONDS, SEAWARD OF KALAKAUA AVENUE. PROPOSED TO RECLAIM.

cities of Washington and Paris. Washington was planned by order of the government before the site was occupied, and the same foresight of plan and execution has been strikingly continued, until it has become a marvelously beautiful city. Paris was recreated and made magnificent by its reconstruction, at enormous cost, under the genius of Baron Haussman.

Incalculable financial economy, eminent results and opportunity are secured by foresight in municipal affairs.

It has been claimed that the higher ground and hillsides are preferred for residence purposes. In Los Angeles the growth of the city has not been toward the hills, but it has spread out on the level grounds toward the southwest. The finest residence sections of the city of Boston are on filled ground where the State government reclaimed the Back Bay and conforming to a well conceived plan of parked avenues, parks and lakes made it the attractive and refined part of the city.

Waikiki, to the extent the beach front will permit, is the choice part of the city of Honolulu, for it offers the close attraction of the sea. The land bordering on the sea commands high prices and little can be secured.

Other than a few lots on Kalakaua Avenue there are in the Waikiki district hundreds of acres that could be made, at comparatively small cost, exceedingly attractive and desirable by a comprehensive plan under governmental control that must otherwise remain of only agricultural value for rice and banana culture or valueless, or be gradually occupied by a class of population that limited means force onto undesirable and unsanitary land.

On map "A" your President confined his estimates to the area, 687 acres, within the dotted and shaded lines, but believes the limit should be the avenue leading from just beyond the junction of King and McCully streets to the Kapahulu road, near Campbell avenue, and that this avenue should be parked one hundred feet or more mauka, and thus form the mauka boundary of the Reclamation district, with the Kapahulu road and Kapiolani Park to Kalakaua avenue the southeastern boundary.

It is presumable that adjustment and self-interest would eventually bring in the other property on Kalakaua avenue.

The manner in which this scheme has been laid out would bring every residence block within one block at least of the sea, the lagoon or a parked avenue, with the exception of seven blocks out of ninety-two.

THIS PROPOSITION IS FINANCIALLY PRACTICAL.

THIS PROPOSITION IS NOT PRESENTED FOR IMMEDIATE EXECUTION IN ITS DETAILS, FOR IT WOULD REQUIRE SOME YEARS FOR THAT.

THIS PROPOSITION IS PRESENTED: FIRST, FOR PUBLIC CONSIDERATION IN THE HOPE IT WILL COMMEND ITSELF TO THE PUBLIC; SECOND, THAT IMMEDIATE STEPS WILL BE TAKEN TO SECURE GOVERNMENTAL CONTROL OF THE ENTIRE AREA INVOLVED.

Section 1025, Revised Laws, stipulates the Board of Health shall report "together with a brief recommendation of the operation deemed advisable to improve such land."

Except for brevity, of which the case does not admit, this report conforms with the mandate of the law.

FILLING THE DISTRICT IMPERATIVE.

To install an adequate sewer system and proper surface drainage, the entire Waikiki district, and some adjacent land, under consideration, requires to be raised to a grade ranging from five to seven feet above sea level. Neither the hills mauka nor the beach can physically or economically furnish the material.

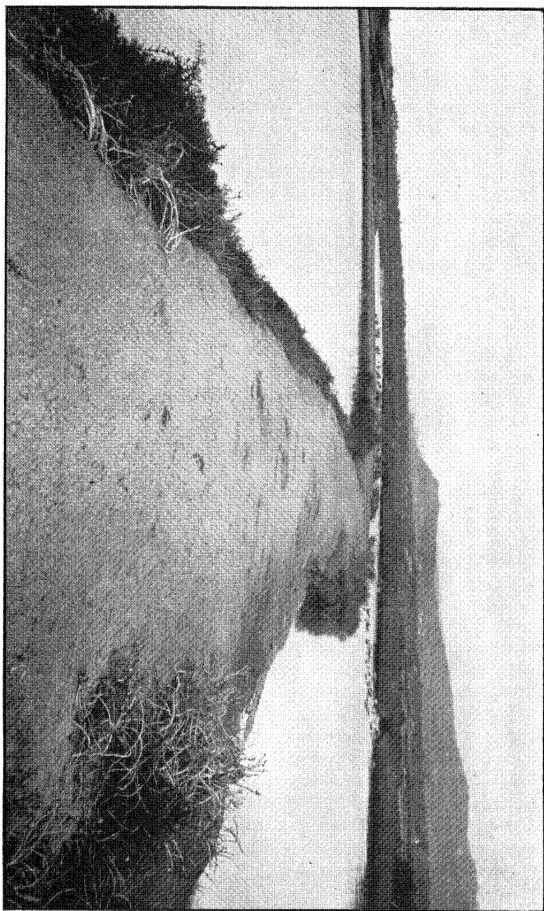


ILLUSTRATION OF DICK AND FISH PONDS NEAR ALA MOANA BRIDGE. PROPOSED TO RECLAIM.

FILLING MATERIAL FOUND.

It occurred long since to your President to seek the material in the rice and banana fields and swamps themselves.

He has caused a series of borings to be made throughout the district, Kapiolani Park and the Beach addition. On map "A" each boring is located and numbered. Profile "B" shows each strata of material, its depth and character.

The finished box before you contains in glass test tubes for each boring, samples of each strata consecutively and permanently arranged for instant information and preservation.

No more desirable, economically workable or sanitary filling has ever been discovered anywhere. Its depth ranges from twenty feet to beyond thirty-seven feet, our deepest boring. The length of pipe line for delivery is moderate and practicable. The method of dredging would be suction, as employed in the harbor.

THE LAGOON.

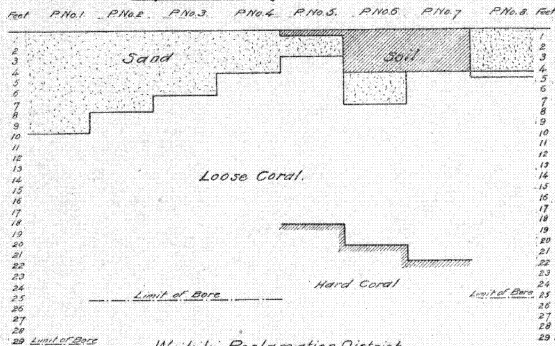
In order to secure filling material a great lagoon would, as a consequence, be formed. This circumstance would give the opportunity to create a quite marvelously beautiful, unique district, a Venice in the midst of the Pacific. Within such a lagoon might be anchored the pleasure yachts of our great neighbors.

Man is becoming discontented with short distances and tame sport. He desires ocean racing and thirty-one seconds per mile automobiling. What may happen if Honolulu can furnish the most attractive means of satisfying these longings in our incomparable climate may be imagined. The filling required would necessitate a waterway nearly 250 feet wide, twenty to twenty-eight feet in depth, and, including the Makee branch fifty feet wide, 22,763 feet long, with channels to the deep sea 4,900 feet additional length. The lagoon would furnish the best boat racing course in the world. Straight-away nearly two miles with a full course of four miles without doubling back is secured.

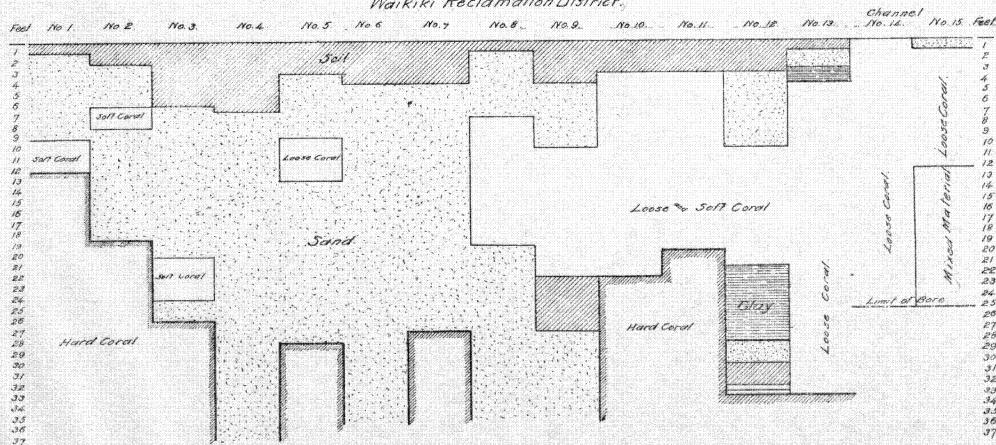
Profiles of Soundings.

Kapiolani Park Beach Addition.

By L.E. Pinkham.



Waikiki Reclamation District.



1941

1942

1943

1944

1945

1946

1947

1948

1949

1950

1951

1952

1953

Frequent boat landings are suggested.

Illuminate the lagoon and boulevards, on each side of the lagoon, with electric lights, and nowhere on the face of the earth could the scene or attraction be paralleled.

The boulevards on each side would furnish eight miles of asphaltum streets for automobiling, not to mention eleven miles of parallel streets or avenues, to say nothing of the additional streets adjacent.

As laid out on map "A" the lagoon starts fifty feet wide at the Beach addition widens gradually to 250 feet, passes through Kapiolani Park, the fields, under McCully street, and turning, goes under Kalakaua Avenue, and makes to sea through the Ala Moana long bridge. At the Beach, Makee inlet, and Ala Moana outlet sea walls are extended to deep water.

In the lagoon the water would be constantly freshened by the entrance of tide water and valley and surface drainage. Tide gates at the Beach and Makee entrances would be closed at high tide and the waters be thus forced through the lagoon to the exit at the Ala Moana bridge.

The feasibility of this plan has been proven by us for the past nine months in flushing by automatic tide gates on a moderate scale at Waikiki. Several bridges would necessarily cross the lagoon, and a design for a bridge is submitted to give a crude idea of what might be appropriate.

RESIDENCE PARK SYSTEM.

In map "C" your President has plotted an ideal residence block under the park system. This block has a net residence area of 400 by 800 feet and the lots 200 by 200 feet.

It has been the custom to secure avenue and landscape effects by building the streets far wider than the requirements of travel demand. Such streets over tax the resources of the community to build and maintain.

The desirable appearance of wide streets and a liberal landscape can better be secured by establishing in each block

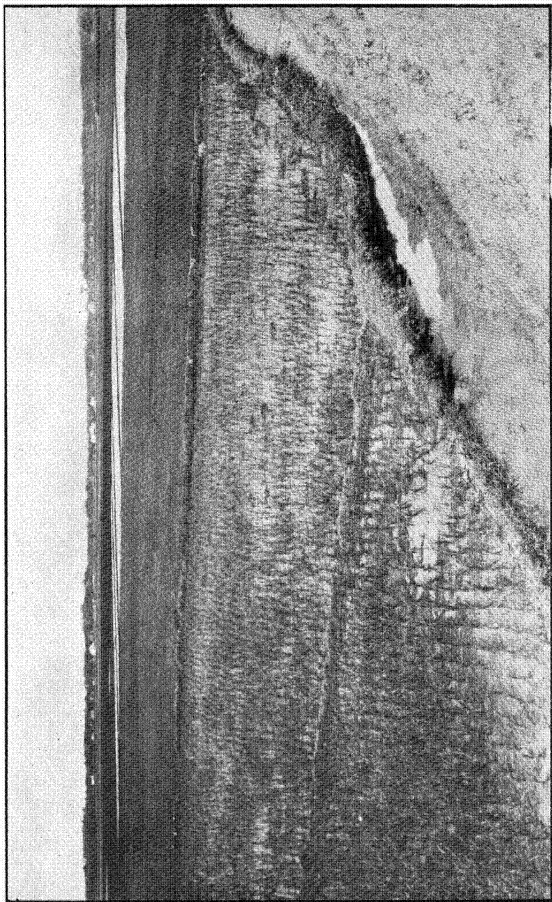


ILLUSTRATION OF A SMALL PORTION OF THE AREA OF RICE FIELDS—PROPOSED TO RECLAIM. MAIN LAGOON PASSES THROUGH THESE FIELDS.

a building line limit in front of which no building of any character may be built. On the main avenues the line should be forty feet back from the inner edge of the sidewalk, and twenty-five feet on side streets. All walls, fences and hedges should be prohibited.

At only one point in each block would connections be allowed with the street lines and mains of the water, sewer, gas, telephone and electric service, all of which would be carried in an underground conduit. These private connections are provided for by a three-foot right of way in the long way center of each block common to all owners, and in which the necessary pipe could be buried. This right of way would not be distinguishable and thus would render impossible the disagreeable impression alleys make.

Sidewalks six feet wide would surround each block.

PUBLIC UTILITIES UNDER SIDEWALKS.

The following method without any question is, in the long run, the least expensive and most economical system of providing for public utilities for a large district in case the authorities know what they are aiming at on the start.

PROFILE D. NO. 1. Shows a cross section of a conduit under the sidewalk, which, being of concrete, forms the top.

MAP C. Shows this conduit is needed only in every other street.

PROFILE D. NO. 4. Shows how mains are provided for on either side of the lagoon. These conduits cost very little as they practically form a part of the bulk head, requiring but little more material than if the bulk head were solid.

AVENUES AND STREETS.

PROPOSED WAIKIKI DISTRICT.

The best rock available for street work is extremely friable and under traffic is ground into powder, and the top dressing

soon begins to be blown or washed away, by rains, heavy storms, or scraped up and carted away by the street cleaners. Vegetation soon makes its way through it.

Oiling the streets improves the situation, but is still an expedient and not perfect construction.

Asphalt, or asphaltum, furnishes the ideal street surface.

It is maintained and cleaned at little expense and can easily and cheaply be washed down from the fire hydrants.

The recent application of expanded metal to reinforcing concrete gives the means of securing a foundation for street construction that insures permanency of grade, contour and surface, especially where there is no occasion to ever disturb a street as in the suggested plans. No loads probable could ever break down this foundation.

CONSTRUCTION.

The construction suggested is a foundation of 5 inches of concrete reinforced with expanded metal, upon which is laid 2 inches of asphaltum surface. This latter might possibly be reduced to $1\frac{1}{2}$ inches. Cross sections and details are shown in Profile "D." No vegetation can penetrate such construction.

WIDTH OF STREETS.

Estimates have been made on 24 feet widths curb to curb for side streets—36 feet on the lagoons—and 26 feet for parallel avenues, and, additional estimates to make corresponding streets on the basis of 26 feet, 40 feet and 30 feet widths. These are extreme widths unless it should be deemed advisable to widen the avenues at the sides of the lagoon.

FINANCIAL.

The possible savings in repairs, maintenance and care would more than cover the additional cost of such streets, to which should be added rentals for the use of the conduits and asphaltum streets for motor vehicle public passenger service.

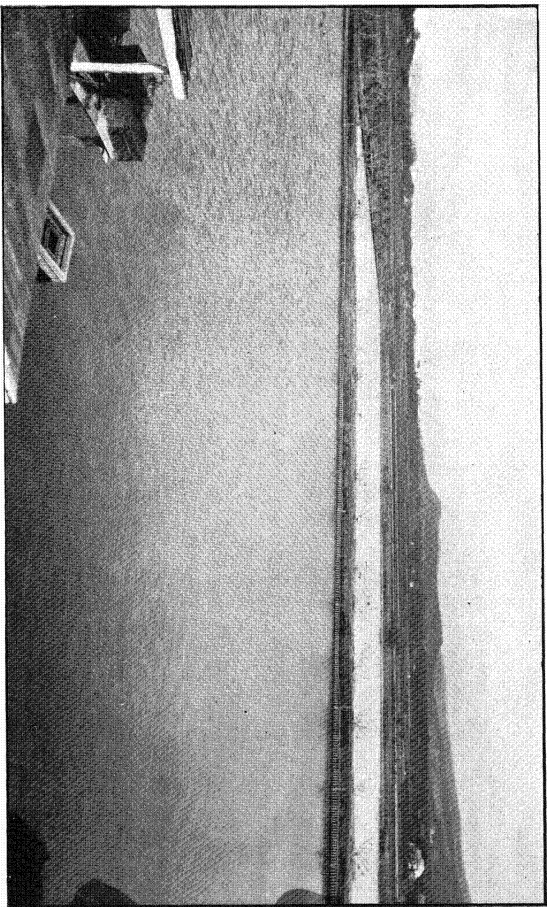


ILLUSTRATION OF DOCK AND FISH PONDS ABOVE KALAKAUA AVENUE AND EAST OF MCCULLY STREET. PROPOSED TO RECLAIM.

TRANSPORTATION PROHIBITION.

With streets of the character proposed the most convenient means of transportation would be motor vehicles of such capacity as would serve the public. Our street car company could more cheaply, than any other way, operate such motor vehicles in connection with its main lines. No street car rails should be allowed laid in the district. As the expense of laying and maintaining track would be obviated, undoubtedly the street railway company would be willing to equitably compensate the city for the use of such streets and thus provide much of the interest on the cost. Heavy draying and loads should be prohibited.

SIDEWALKS.

These have been suggested as six feet in width, except eight feet at lagoon side. They are suggested to be constructed 4 inches thick reinforced with expanded metal.

Much of their length and width would be utilized for the top of the conduits.

STORM WATERS AND SEWERS.

These waters from the valleys would be intercepted and through the storm sewers be drained into the lagoon as would also the surface drainage. The storm sewers would be under the sidewalks as shown in Profile "D."

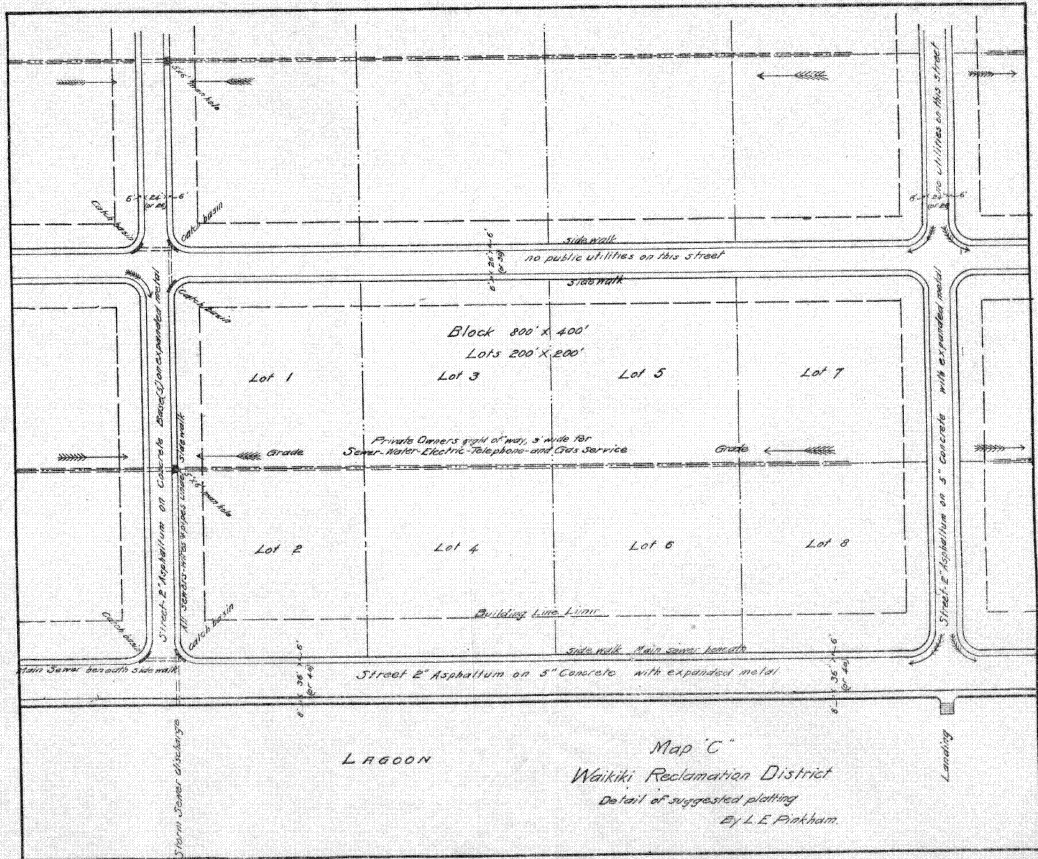
Ordinary sewage is provided for, but its ultimate disposal does not require present solution.

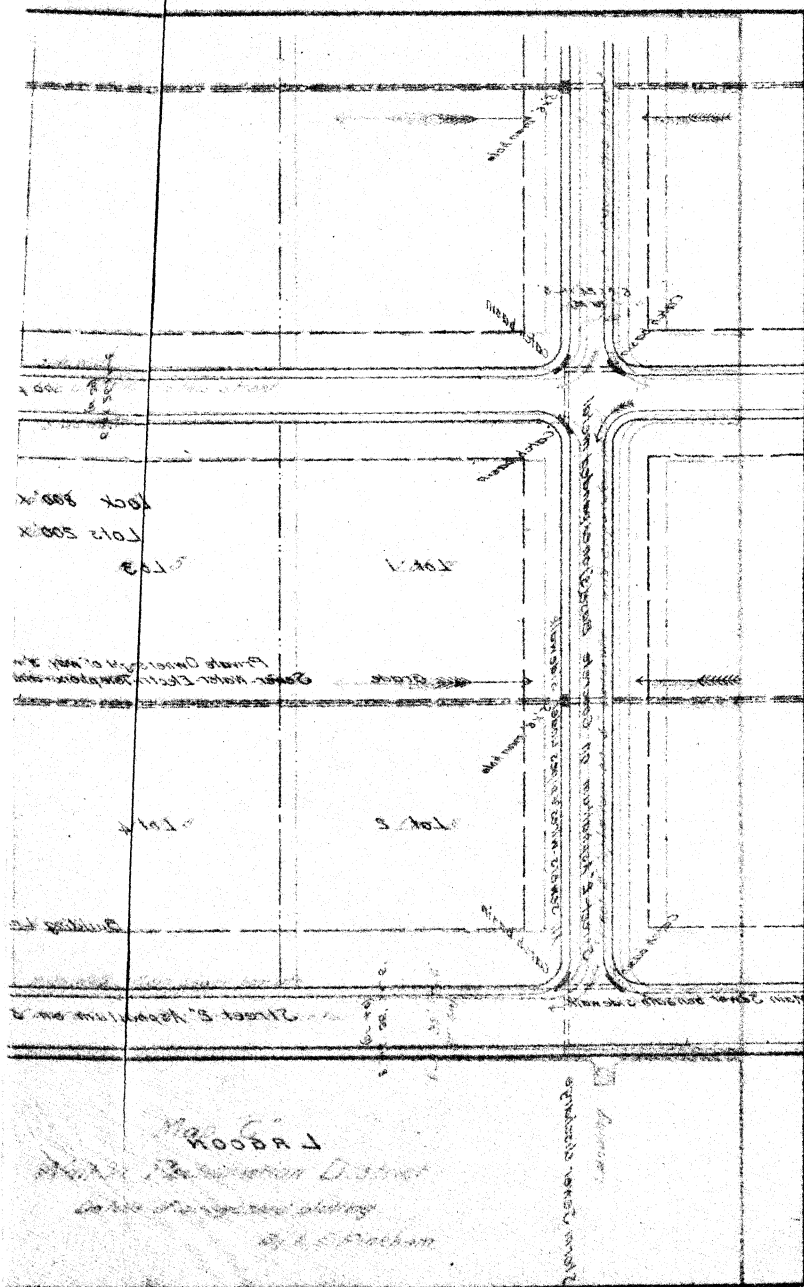
RAILINGS.

For the protection of the public, as the waters of the lagoon would be very deep, a strong pipe railing has been suggested.

DETAILS OF ESTIMATES.

While the whole plan is not exactly estimated, they are as closely figured out as time and means allow. The plans them-





selves are only tentative. However, by the lineal foot, the complete block, or mile, the estimates of quantities of material and work are exact. I have also added estimates for the Park and Channel divisions, only omitting tide gates and bridges.

No cost prices for materials or labor are given. Anyone interested can make his own estimates. For my own satisfaction I have in my possession a close estimate of the entire cost.

LANDS INVOLVED.

I have a complete list of owners, areas, and assessed valuation of all the land involved.

ACKNOWLEDGMENTS.

I am deeply indebted to the Shippers' Wharf Committee for financial aid in this matter. To Mr. Walter E. Wall, of the Survey Department, I am particularly indebted, and also to Mr. C. S. Holloway and Mr. James L. Holt of their respective departments as well as the employees of these, and my own department where aid has been requested. If there is any crudeness shown in drawings submitted I am responsible for it, hence by signature.

CONCLUSION.

In considering, as the law requires, the sanitary condition and sanitary prospects of the low and swamp lands of the Waikiki district, it would have been unwise to simply call attention to individual pieces of property when the whole district is involved.

To state conditions without suggesting a remedy, as the law requires, would have been idle. A remedy applied at large is the most effectual and economical and in general public interest, and ultimately the best for every individual private interest.

This whole memorandum with its exhibits can be considered as a suggestion only. It claims to be nothing else.

Should the government, under the pressure of public opinion, take steps to render these plans possible within the coming decade, by taking steps now to secure control of the lands, far more perfect plans can be formed and possible economies be thought out.

A great opportunity for park extension is presented.

The only merit claimed as indisputable is the endeavor to arouse our citizens to a broad view of municipal affairs and opportunity, and the endeavor to create a desire to make Honolulu a thoroughbred city instead of a common town.

I hope the memorandum will receive whatever criticism is its due.

Personally I welcome criticism. I am accustomed to it. No delicacy need be accorded me on that point.

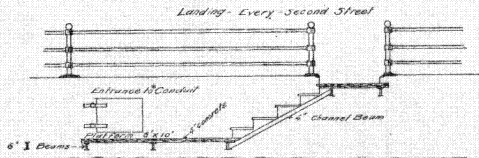
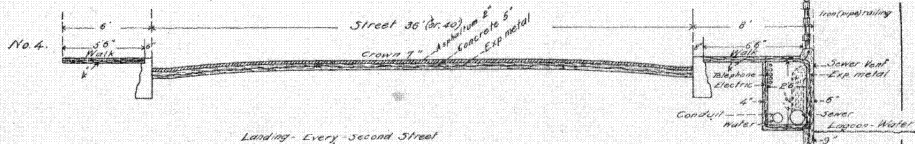
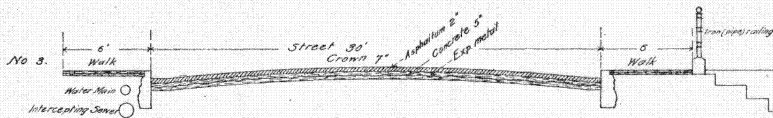
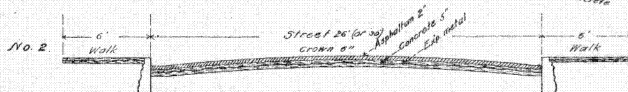
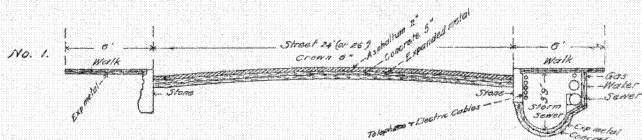
The scheme is a practical one, financially and otherwise, and cannot be doubted when the trend of events is considered.

According to law the connection of the Board of Health with the execution of sanitary or other improvements ends with recommendations and persuasion.

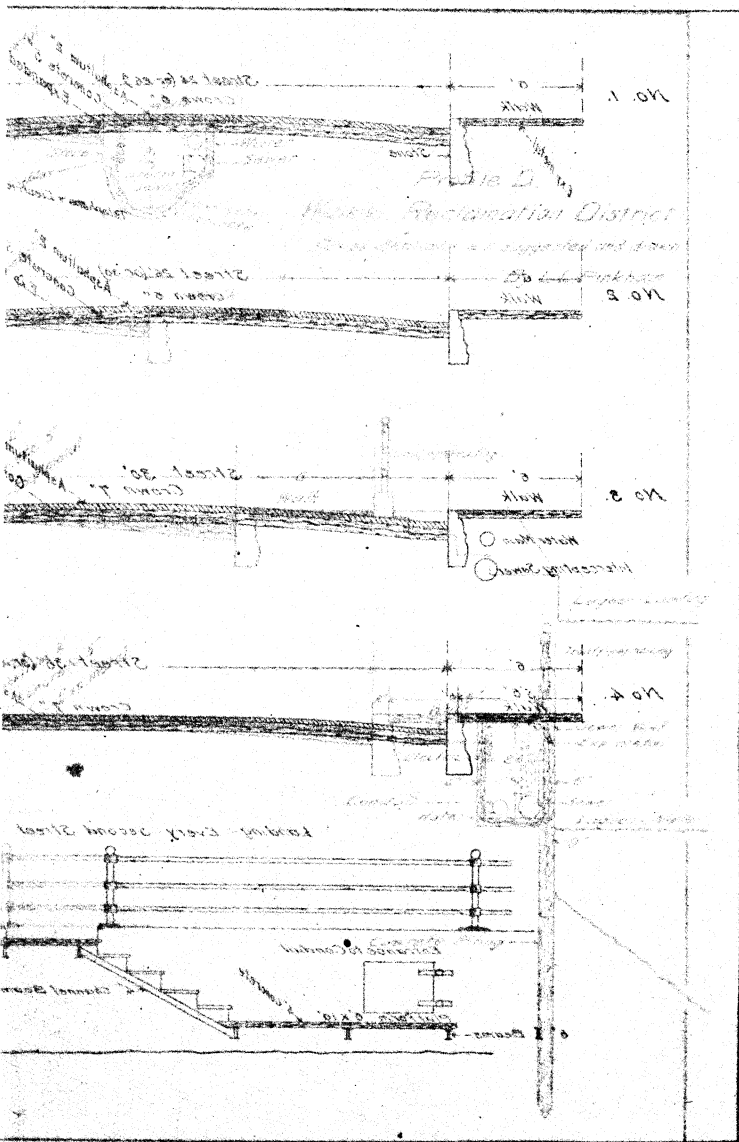
Very respectfully submitted.

L. E. PINKHAM,

President, Board of Health.



Profile D.
Waikiki Reclamation District
Cross Sections as suggested and drawn
By L.E. Pinkham



SOUNDINGS FOR DREDGING MATERIAL.

KAPIOLANI PARK.

P. No. 1.

Strata No. 1—Sand 9 ft. 6 in.
 Strata No. 2—Loose coral...19 ft. 6 in.

Total 29 ft.

P. No. 2.

Strata No. 1—Sand 7 ft. 6 in.
 Strata No. 2—Loose coral...17 ft. 6 in.

Total 25 ft.

P. No. 3.

Strata No. 1—Sand 6 ft.
 Strata No. 2—Loose coral...19 ft.

Total 25 ft.

P. No. 7.

Strata No. 1—Soil 4 ft.
 Strata No. 2—Loose coral...17 ft. 6 in.
 Strata No. 3—Hard coral...

Total 21 ft. 6 in.

P. No. 4.

Strata No. 1—Sand 4 ft.
 Strata No. 2—Loose coral...21 ft.

Total 25 ft.

P. No. 5.

Strata No. 1—Soil 6 in.
 Strata No. 2—Dark sand... 2 ft.
 Strata No. 3—Loose coral...15 ft. 6 in.
 Strata No. 4—Hard coral..

Total 18 ft.

P. No. 6.

Strata No. 1—Soil 4 ft.
 Strata No. 2—Dark sand... 3 ft.
 Strata No. 3—Loose coral...13 ft.
 Strata No. 4—Hard coral..

Total 20 ft.

P. No. 8.

Strata No. 1—Sand 4 ft.
 Strata No. 2—Hard coral... 6 in.
 Strata No. 3—Loose coral...20 ft. 6 in.

Total 25 ft.

WAIKIKI RECLAMATION DISTRICT.

W. No. 1.

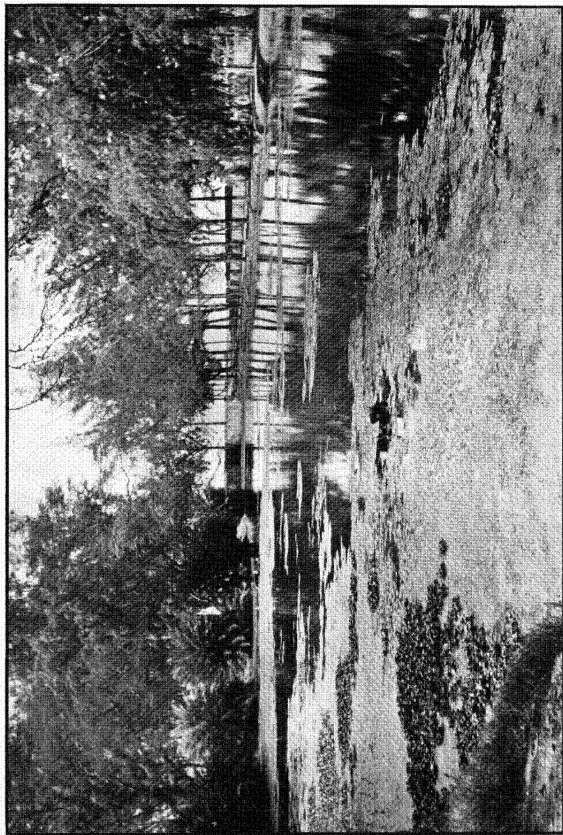
Strata No. 1—Soil 1 ft.
 Strata No. 2—Gray sand... 7 ft. 6 in.
 Strata No. 3—Soft coral... 3 ft. 6 in.
 Strata No. 4—Hard coral..

Total 12 ft.

W. No. 2.

Strata No. 1—Soil 2 ft.
 Strata No. 2—Sand 4 ft.
 Strata No. 3—Soft coral... 2 ft.
 Strata No. 4—Dark sand...10 ft.
 Strata No. 5—Hard coral..
 Strata No. 6—Hard coral...

Total 18 ft.



PICTURESQUE, BUT OFFENSIVE PONDS IN KAPIOLANI PARK NEAR MAKEE INLET. PROPOSED TO REPLACE WITH DEEP WATER LAGOON.

W. No. 3.

Strata No. 1—Soil 6 ft.
 Strata No. 2—Sand 9 ft.
 Strata No. 3—Sand 5 ft.
 Strata No. 4—Loose coral.. 4 ft.
 Strata No. 5—Sand 2 ft.
 Strata No. 6—Hard coral...

Total 26 ft.

W. No. 5.

Strata No. 1—Soil 3 ft.
 Strata No. 2—Sand 4 ft.
 Strata No. 3—Light sand... 2 ft.

 Strata No. 4—Loose coral.. 4 ft.
 Strata No. 5—Gray sand...10 ft.
 Strata No. 6—Dark sand... 3 ft.
 Strata No. 7—Gray sand... 2 ft.
 Strata No. 8—Coral 3 in.
 Strata No. 9—Soft coral... 7 ft.

Total 35 ft. 3 in.

W. No. 7.

Strata No. 1—Soil 4 ft.
 Strata No. 2—Sand 6 ft.
 Strata No. 3—Gray sand...13 ft.
 Strata No. 4—Black sand... 4 ft.
 Strata No. 5—Hard coral...

Total 27 ft.

W. No. 9.

Strata No. 1—Soil 4 ft.
 Strata No. 2—Gray sand... 6 ft.
 Strata No. 3—Loose coral..12 ft.
 Strata No. 4—Black soil... 5 ft.
 Strata No. 5—Gray sand.... 3 ft.
 Strata No. 6—Brown sand.. 5 ft.

Total 35 ft.

W. No. 4.

Strata No. 1—Soil 6 ft. 6 in.
 Strata No. 2—Dark sand...16 ft.
 Strata No. 3—Gray sand...14 ft. 6 in.

Total 37 ft.

W. No. 6.

Strata No. 1—Soil 4 ft.
 Strata No. 2—Gray sand...12 ft.
 Strata No. 3—Light gray
 sand 7 ft.
 Strata No. 4—Black sand...12 ft. 6 in.

Total 35 ft. 6 in.

W. No. 8.

Strata No. 1—Soil 1 ft.
 Strata No. 2—Gray sand... 6 ft.
 Strata No. 3—Loose coral..12 ft.
 Strata No. 4—Gray sand... 6 ft.
 Strata No. 5—Fine sand...10 ft.

Total 35 ft.

W. No. 10.

Strata No. 1—Soil 3 ft.
 Strata No. 2—Loose coral..19 ft.
 Strata No. 3—Hard coral...

Total 22 ft.

W. No. 11.

Strata No. 1—Soil	3 ft.
Strata No. 2—Loose coral...	17 ft. 6 in.
Strata No. 3—Hard coral...	

Total 20 ft. 6 in.

W. No. 13.

Strata No. 1—Soil	1 ft.
Strata No. 2—Gray sand...	1 ft. 6 in.
Strata No. 3—Sand and clay	1 ft. 6 in.
Strata No. 4—Loose coral...	29 ft.

Total 33 ft.

W. No. 12.

Strata No. 1—Soil	3 ft.
Strata No. 2—Black sand...	7 ft.
Strata No. 3—Loose coral...	11 ft.
Strata No. 4—Brown clay..	7 ft.
Strata No. 5—Black sand...	2 ft.
Strata No. 6—Red soil	2 ft.
Strata No. 7—Coral	6 in.
Strata No. 8—Gray sand...	6 in.
Strata No. 9—Hard coral...	

Total 33 ft.

CHANNEL SOUNDINGS.

Channel No. 14.

Strata No. 1—Sand	25 ft.
-------------------------	--------

Total 25 ft.

Channel No. 15.

Strata No. 1—Sand	1 ft.
Strata No. 2—Loose coral...	11 ft.
Strata No. 3—Mixed material	13 ft.

Total 25 ft.

AVERAGE DEPTH OF DREDGABLE MATERIAL.

KAPIOLANI PARK	23 ft. 6 in.	
WAIKIKI RECLAMATION DISTRICT.....	28 ft. 5 in.	Additional in places.
ALA MOANA CHANNEL	25 ft.	No bottom found.

ACREAGE.

WAIKIKI RECLAMATION DISTRICT.

	Basis 24 ft.-26 ft. and 36 ft. wide streets.	Basis 26 ft.-30 ft. and 40 ft. wide streets.	
Total acres in district.....			687
Waste acres	157 27/30	166 4/30	
Net residence acres.	529 3/30	520 26/30	
	687	687	687

MATERIALS REQUIRED FOR RECLAMATION.

NOTE: All materials and work are estimated on the basis of complete execution of the work in the most thorough manner. Many economies could be had in the execution of the work, but it is easier to reduce than increase estimates and far more satisfactory, so no effort has been made to present a showing of small cost.

Basis of streets 24 ft.-26 ft. and 36 ft. wide from curb to curb.

	EXPANDED METAL sq. ft.	NOS. 2 & 3 ROCK cu. yds.	ROCK SAND cu. yds.	CEMENT bbls.	ASPHALTUM Short tons.
Streets	2,985,412	43,378	14,626	49,361	31,275
Sidewalks	1,187,639	14,266	4,756	16,051	
Conduits	315,441	3,710	1,236	4,082	
Lagoon Bulk-heads	199,695	4,475	1,492	5,033	
Lagoon Landings	1,450	28	9	32	
Total	4,689,637	66,857	22,119	74,559	31,275
For 26 ft.-30 ft. and 40 ft.					
Streets add.....	359,000	1,987	745	2,235	3,949
Grand total	5,048,637	68,344	22,864	76,794	35,224

DETAILS.

MATERIALS FOR WAIKIKI RECLAMATION DISTRICT.

	Basis 24 ft.-26 ft. & 36 ft. streets.	Add for 26 ft.-30 ft. & 40 ft.
Expanded Metal.....	4,689,637 sq. ft.	359,000 sq. ft.
Nos. 2 and 3 Rock.....	66,357 cu. yds.	1,987 cu. yds.
Rock Sand.....	22,119 cu yds.	745 cu. yds.
Cement.....	74,559 bbls.	2,235 bbls.
Asphaltum.....	31,275 short tons	3,949 short tons
Curbing 6 inches.....	177,821 lin. feet	
Curbing 8 inches.....	22,375 lin. feet	
Piling.....	53,688 lin. feet	
3-inch gal. pipe.....	8,760 lin. feet	
2-inch gal. pipe.....	22,750 lin. feet	
1½-inch gal. pipe.....	44,500 lin. feet	
Flanges Specl.....	1,896	
T's. 2-inchx3-inch.....	1,896	
4 way 1½-inchx3-inch.....	3,792	

I. Beams, 4 in.....	3,465 lbs.
$\frac{3}{8}$ -in. bolts.....	7,584
Sewer pipe, 8 in. vit.....	14,072 feet
Sewer pipe, 12 in. vit.....	22,610 feet
C. I. water pipe, 4 in.....	14,219 feet
C. I. water pipe, 6 in.....	22,610 feet
Castings—grate and man.....	142
Hydrants.....	31

LABOR ESTIMATES FOR WAIKIKI RECLAMATION DISTRICT.

Sundry Labor.

Excavation.....	29,166 cu. yds.
Laying curb 6 in.....	177,821 lin. ft.
Laying curb 8 in.....	22,375 lin. ft.
Making joints 8 in. vit pipe.....	1,316 joints
Making joints 12 in. vit. pipe.....	1,920 joints
Making joints 4 in. C. I. water pipe.....	1,210 joints
Making joints 6 in. C. I. water pipe.....	2,100 joints
Laying in conduits sewer pipe.....	36,682 lin. ft.
Laying in conduits water pipe.....	36,829 lin ft.
Setting manholes, &c.....	142
Pile driving.....	2,237 piles
Building railing.....	22,375 lin. ft.

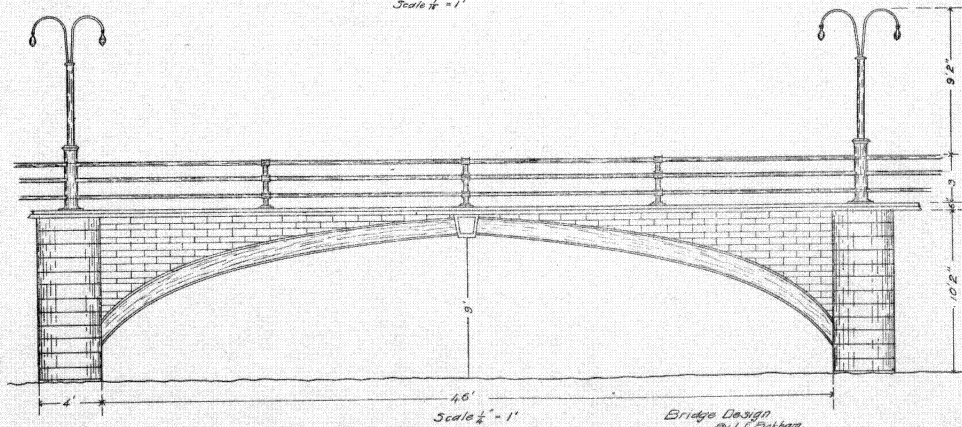
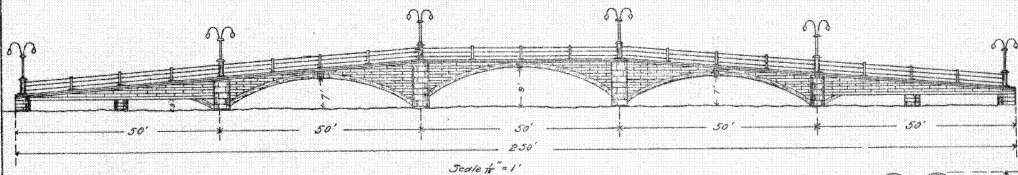
LABOR ON CONCRETE WORK.

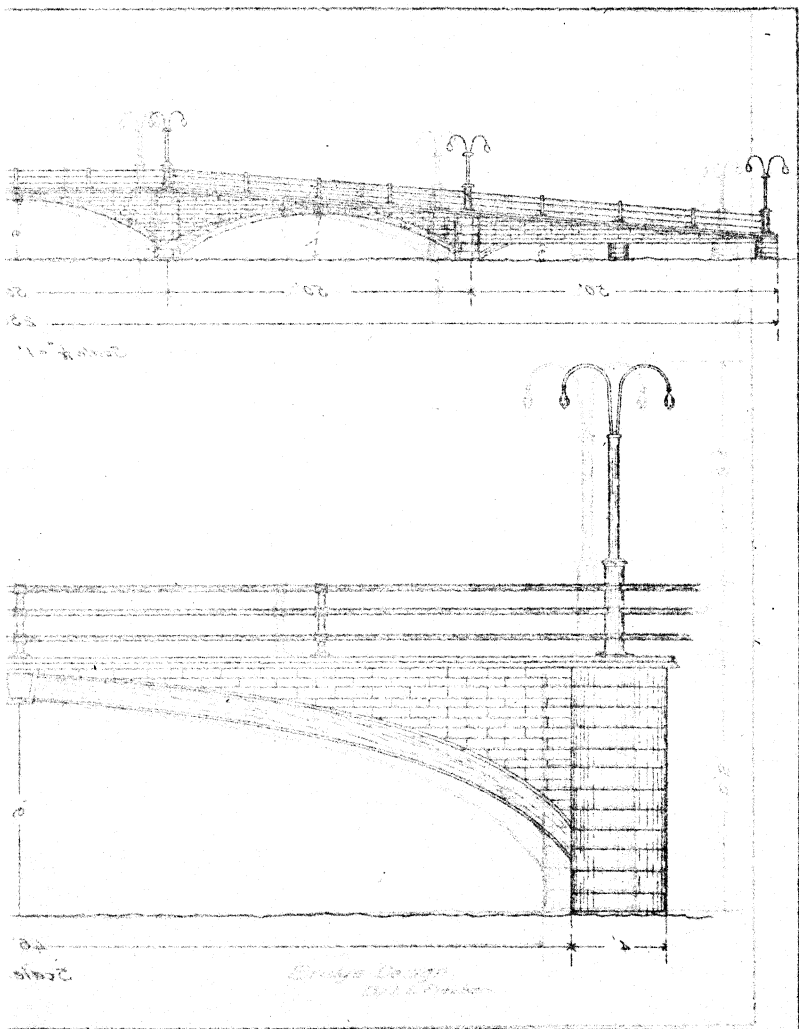
Streets (including greater widths).....	2,843,250 sq. ft. 5 in. thick ex. metal or 3,202,250 sq. ft.
Sidewalks	1,139,064 sq. ft. 4 in. thick ex. metal
Conduits	299,421 sq. ft. 4 in. thick ex. metal
Landings	1,518 sq. ft. 4 in. thick ex. metal
Bulkheads 6 in.x4½ ft. verticle.....	100,687 sq. ft. 6 in. thick ex. metal
Bulkheads 9 in.x4 ft. verticle.....	69,500 sq. ft. 9 in. thick ex. metal

DREDGING AND SPREADING MATERIAL.

TO BE SPREAD OVER 622 $\frac{5}{6}$ ACRES.

	On 2½ ft. fill cubic yds.	On 3 ft. fill cubic yds.	On 3½ ft. fill cubic yds.
From Kapiolani Park Lagoon.....	307,654	369,185	443,022
From Waikiki Reclamation District Lagoon	2,126,912	2,532,293	2,734,600
From Ala Moana Channel.....	77,377	92,852	327,348
	2,511,943	3,014,327	3,504,970





MATERIALS REQUIRED FOR KAPIOLANI PARK AND MAKEE INLET.

NO. STREETS ESTIMATED.

	Expanded Metal Sq. ft.	Nos. 2 & 3 Rock Cub. yds.	Rock Sand Cub. yds.	Cement Bbls.
Sidewalks 6 ft. wide.....	77,256	954	318	1,000
Lagoon Bulkhead 7 ft.x9 in..	90,132	2,504	835	2,900
Lagoon Landings	1,450	28	9	32
	<u>168,838</u>	<u>3,486</u>	<u>1,162</u>	<u>3,992</u>

DETAILS.

MATERIALS REQUIRED AS ABOVE.

Expanded metal.....	168,838 sq. ft.
Nos. 2 and 3 rock.....	3,486 cubic yards
Rock sand	1,162 cubic yards
Cement	3,992 barrels
Piling.....	12,860 feet
3-inch gal. pipe.....	3,219 feet
2-inch gal. pipe.....	12,876 feet
1½-inch gal. pipe.....	25,752 feet
Flanges Spec1.....	1,073
Ts. 2 in.x3 in.....	1,073
4 way 1½ in.x3 in.....	2,146
I. Beams 4 in.....	3,465 lbs.
⅝-in. Bolts.....	3,800
Curbing 6".....	12,860 feet

DETAILS.

SUNDRY LABOR.

Laying curb 6 in.....	12,860 feet
Pile driving	643 piles
Building railing	12,860 feet

CONCRETE WORK.

Sidewalks 6 ft.x4 in.....	77,256 sq. ft.
Lagoon Bulkhead 7 ft. x 9in. vert.....	90,132 sq. ft.
Landings	1,450 sq. ft.

OMISSIONS THROUGHOUT.

Bridges	Channel Bulkheads
Tide Gates	Electric Poles and Fixtures



Supplementary Remarks.

Honolulu, Feb. 15th, 1907.

To the Board of Health:

Although this scheme of reclamation was presented nearly one year ago it was necessary to devote several months thereafter to securing an abstract of the property so the owners, holdings and assessed valuation might be known.

The San Francisco earthquake occurred and it was necessary to await indications of its effect on Honolulu's future. The attitude of the United States government toward its outlying portions seemed undecided.

San Francisco's disaster has not affected Hawaii. The United States government will undoubtedly make the Island of Oahu one of the strongholds of the world in both a military and naval sense.

This fact alone will make Honolulu unique among cities and a place of the greatest interest to travelers. If, in addition to this and the scenic and climatic advantages of our Islands we remove conditions that are unsanitary, unhygienic and repellant, and carry out plans for a broad, beautiful, strikingly artistic city we may expect to attract permanent residents and tourists. Curiosity is soon satisfied, but the attractions of social life, never confined within doors, remain always pleasing. Nowhere on earth are the conditions and opportunities equal to those possible here.

While we cannot predicate the future, there is every indication Honolulu has a promising future on lines other than those so prominently forced to our attention daily.

Cities, whose citizens, officials and legislators, (state, territorial, or municipal) wisely anticipate the future are able to accomplish great public works with little ultimate cost to the government and much profit to property owners.

The fear of cost and taxes rises at once to the vision of most persons.

In many of the better forms of government and taxation for improvements this apprehension does not exist, as improvement districts are established for such items as parks, sewers, special street construction, boulevards, etc., and to these districts are

taxed the larger per cent. of the cost for the reason the immediate private property is immensely increased in value and in justice should bear its just share of the expense. A general improvement takes place therefrom which affects the whole city, so general taxation stands a proper proportionate tax.

Our system of taxation is crude and unscientific and only represents the fear of taxation by the limit of the rate to one per cent., while the assessor beats the bush for funds by fixing absurd valuations. He is obliged to.

The Waikiki flats are a nuisance and menace and must be ultimately abated.

They now yield some agricultural income that can never increase materially.

We have arrived at the point where some scheme for their reclamation must be given attention. If the owners of the property are broad minded and harmonious there is little doubt but in the course of time covering not many years, the whole place can be transformed into a place of unique beauty to the notable embellishment of Honolulu, to its reputation abroad, and to the profit of the property owners.

LEGISLATION NECESSARY.

To Maintain Statute Quo.

An enactment prohibiting the erection of any building within the limits proposed (with any additional areas advisable) until the land is brought to a legal grade.

To Establish Grades.

An enactment providing for establishing legal grades within the district, which should not be the least possible minimum, but such as will allow the district to become a first class resident district.

To Survey the District.

An enactment for the survey and laying out of the district into waterways, boulevards, streets, parks, sidewalks, public utilities,

conduits, building lines, bridges, retaining walls, bulkheads, gates and piers, all to be done under competent landscape and engineering authority, and to conform in a general way to the plans presented herewith.

To Provide for Non-interference with the Plans.

An enactment providing no streets, alleyways or waterways shall be established within the proposed district until the survey has been completed and public notification been given by the official filing of the plans in the "Bureau of Conveyances"; and

Providing that notification be given each owner of the areas, and their location, of his property that it is proposed to condemn for public purposes; and

Providing that the said notification shall hold the areas designated inviolate to the government until it shall in the course of said improvements so appropriate the areas indicated.

To Establish an Improvement District.

An enactment to establish the proposed Waikiki Reclamation District.

To Fix Assessment of the Costs.

An enactment providing for a commission to assess the proportions of all costs, of whatever nature, on the property owners in said improvement district, for their share of the benefits accruing and on the government (territorial, county or municipal) as they may exist for the general benefits.

To Make an Empowering Act.

An enactment empowering the property owners to form an association or incorporation with all the powers necessary to carry out the reclamation scheme proposed and to associate with themselves capital sufficient therefor.

THE OWNERS.

The abstract discloses 117 owners of an area of 702 and 135/1000 acres, valued for taxation at \$449,486.40. Of this area

625 acres are controlled by sixteen interests, hence the organization should not be difficult if these interests are agreed.

CHANGES IN PLANS.

It might be well to take in more land toward Sheridan street and extend the lagoon to the sea between the residence of Wm. H. Smith and the Campbell property, rather than through the former Kunst property. The street plan might be varied in some respects.

CONCLUSIONS.

The writer now leaves the matter in the hands of the public and property owners as he has gone as far as he can. He has expended much time and thought and has been actuated solely by a sincere desire for the public good and a beautiful Honolulu.

L. E. PINKHAM.

ABSTRACT, A. D. 1906.

AREAS, OWNERS AND ASSESSED VALUATIONS.

PROPOSED WAIKIKI RECLAMATION DISTRICT.

Abstract by F. W. Makinney for L. E. Pinkham.

Owners.	Acres.	Fathoms.	Square Feet.	Valuation.
A				
Alec, C., Estate of.....	2.75			\$ 1,200.00
Ahin, Y.....	.95			370.00
Ahrens and Bowler.....	22.70			12,000.00
Anno, S.....			8,400	1,000.00
Anin, Y., Trustee.....			20,000	350.00
Armitage, Harry	1.49			7,000.00
Ainoa, G. W.....	.22			650.00
Akau, Achi K., Estate of; W. O. Smith, Trustee	.677			250.00

Owners.	Acres.	Fathoms.	Square. Feet.	Valuation.
B				
Bishop Estate	114.61			53,808.00
Boyd, Helen	.25			240.00
Boyd, Helen, Guardian.	.55			250.00
Boyd, Helen, Trustee... ..	7.95			180.00
Bowler, J. F.....		372		200.00
Buchanan, W. M.....			14,400	2,500.00
Booth, C. W.....	3.12			1,500.00
Booth, E. K.....	10.49			5,350.00
Brown, A. M.....	.21			100.00
C				
Castle, W. R., Trustee.. ..	.52			225.00
Castle, W. R.....	5.38			2,500.00
Carter, G. R. and C. J.	3.91			2,335.00
Carter, G. R.....			20.750	1,000.00
Cooke, C. M., Jr.....	.97			500.00
Cleghorn, A. S.....	48.255	1143		24,850.00
Chung, Hoon, Wm. J.. ..	.12			100.00
Cartwright, Bruce.....	24.12			8,950.00
Ching Lum			20,000	850.00
D				
Davis, M. H. S.....	3.54			3,600.00
E				
Ena, John	24.16			14,455.00
G				
Gilman, Minnie H.....			7,257	435.40
Gonsalves, M. J.....	1.720			2,050.00
Goo Kim, Mrs. E. K... ..	1.242			600.00
Giffard, T. D. K.....	.978			500.00
H				
Honolulu Rapid Transit & Land Co., Ltd.....	3			1,500.00
Hawaiian Trust Co., Ltd... ..	.603			300.00
Hustace, M. E.....			78.487 6/10	5,500.00

Owners.	Acres.	Fathoms.	Square. Feet.	Valuation.
Hao, John	.44			250.00
Hip Wo Tong, Trustees of	2.11			1,000.00
Hoolae, Florence K....		942		750.00
Hobron, E. C.....	30.355			15,425.00
Hackfeld, H. & Co., Ltd.	1.14			315.00

I

Iona, Malaea Kalua....	.43			200.00
Ii, John, Estate of....	32.03	1205		44,100.00
Iaukea, C. S.....	2			1,000.00
Ikeole, Mele			4750	300.00
Ilikealani liilii	.33			175.00

J

Judd, H. S.....	3.44			3,440.00
Judd, A. H. B.....	2.84			2,630.00
Jorgensen, J.....	.70			1,895.00

K

Kawailani, J. H.....	.52			200.00
Kapiolani Estate	12.09			6,100.00
Kamehaiku, Heirs of..	.13			80.00
Kailikole	.74			250.00
Kapule	.06			40.00
Koleka	.75			240.00
Kahele	.323			125.00
Kaaipulu	1			1,150.00
Kaaipulu and Kaiui....	.20			100.00
Kaehu, J. F.....	.25			225.00
Kaaeae and Kaiui.....	1.333			650.00
Kahaleone	.056			50.00
Kaouli, H., Estate of...			53,804	500.00
Kalauokalani, S.....			90,322	1,395.00
Kemoho, Sam	.47			200.00
Kaohuokalani, J.....	.11			250.00
Kawelohelii, S. W. H..	.144			75.00
Kaehu, J. F.....	1.565			400.00
Kauhane, Rev. J.....	1.25			75.00
Kawailani, J. H. (2)...	.22			100.00
Kamaka and Kailikola.	.322			150.00

Owners.	Acres.	Fathoms.	Square. Feet.	Valuation.
Kailipola	.68			300.00
Kapuniāi	.36			175.00
Kahele Mileka.....	1.34			650.00
Kawanimauloa, John and Wailelua John.....	2.25			2,000.00

L

Lam Wo Sing.....	18.431			8,328.00
Lam Wo Sing and H. Hackfeld & Co., Ltd.	.214			100.00
Lam Wo Sing and Kaili- kole and Luahine....	3.12			1,500.00
Lam Wo Sing and Wong Tai Hee.....	.91			300.00
Lam Wo Sing and J. A. Magoon	8.745			5,300.00
Lai Kin	1.45			440.00
Leslie, Mary E.....	1.23		30,760	2,700.00
Liliuokalani, ex-Queen.	23.066			17,195.00
Lam Yate	1.638	168		715.00
Lameka	.57			250.00
Legros, J. A.....			7,150	1,100.00
Legros, E. M.....			11,800	2,560.00
Lewis, Alice S.....			20,000	2,200.00
Lewis, J.....			89,561	3,840.00

M

Manoha's Wife		446½		1,000.00
Magoon, J. A.....	10.97	446½	5,980	7,775.00
Magoon, J. A., et al....	7.145			3,800.00
Magoon, E. M.....	1.12			1,200.00
McKinley Park Asso- ciation	6.06			2,000.00
Macfarlane, F. W.....			6,234	275.00
Mikala Keiki Heirs....	1.07			500.00

N

Nolte, Mrs. L. K.....	.55			250.00
Ninia and seven others.		423		200.00
Nolte, Frederika	.55			250.00
Noholoa Heikaalani....	1.02			1,000.00
Nohona, G. K.....	.333			650.00

Owners.	Acres.	Fathoms.	Square. Feet.	Valuation.
O				
Oahu, Heirs of.....	.17	103		130.00
P				
Pendergast, Eleanor K., Estate of	.53			250.00
Q				
Queen's Hospital	117.02		29,781	80,100.00
S				
Swanzy, F. M., Trustee	.92			600.00
Sumner, J. K.....	1.31			700.00
Saahao	.59			500.00
Swinton, Sarah	.41			300.00
Sunahale, S., and seven others	.71			150.00
Saoa, Henry Hoolae...	1.25			400.00
Siikoi, Maria K.....	1.80			575.00
T				
Territory of Hawaii...	86.65			43,075.00
W				
Wilder, S. G.....	3.40			3,000.00
Ward, Mrs. V.....	1.59			4,000.00
Waterhouse, Henry, Es- tate of	.60	185		845.00
Wong Lum (1).....	2.75			1,350.00
Wiliokai, Mrs. K.....			12,000	2,500.00
Woolsey, Mrs. K.....	1.91			2,200.00
Wong Lum (2).....	.36			200.00

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